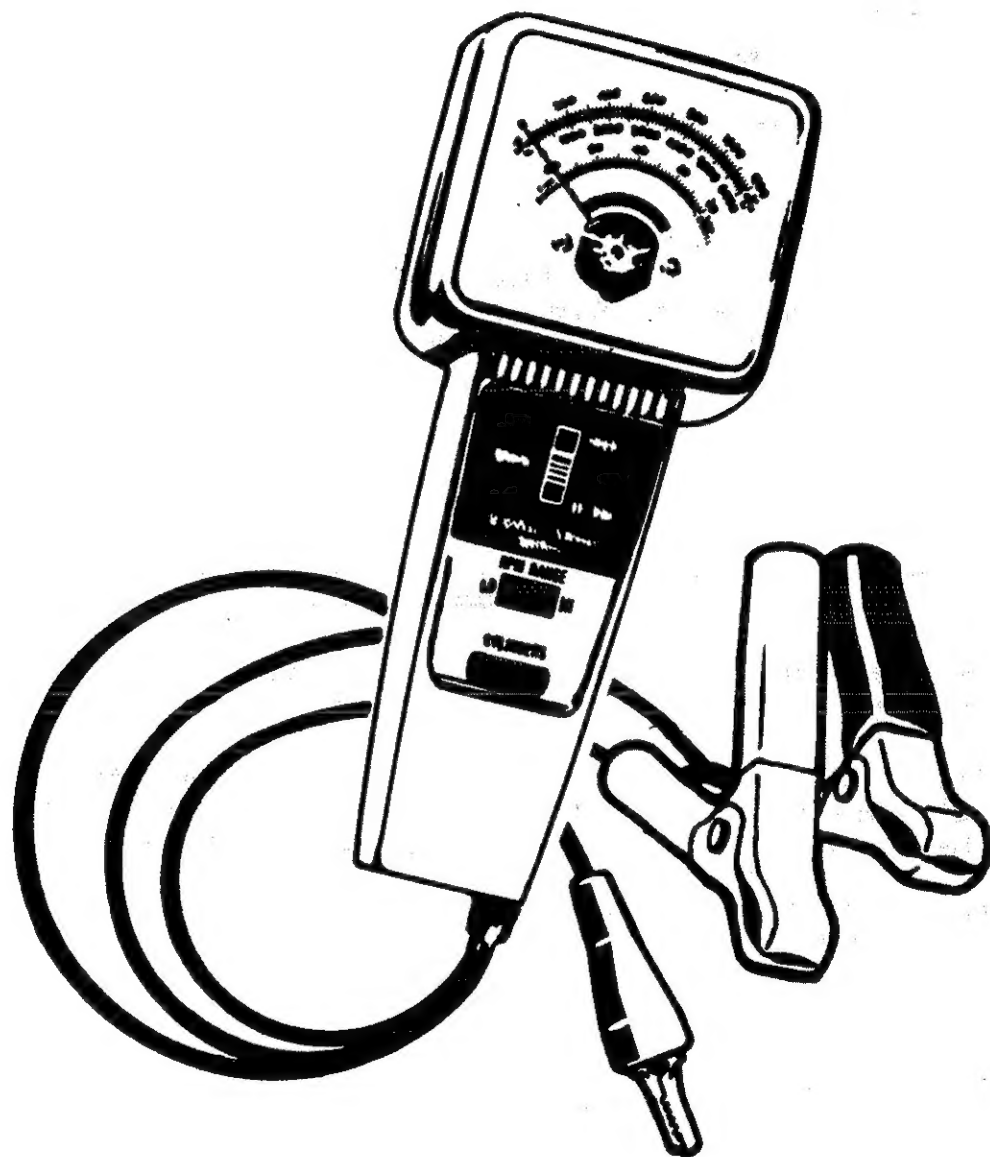


PRECISION **Duty Cycle Tach-Dwell Meter**



Instruction Manual

WARNING



Important Operating & Safety Notes . . . READ BEFORE PROCEEDING WITH TESTS.

1. **ALWAYS** work in a well ventilated area . . . **NEVER** start a vehicle's engine in an enclosed area.
2. **NEVER** smoke or allow any other open flame to come within 25 feet of vehicle being tested.
3. **ALWAYS** insure that **EVERYONE** within close proximity of the vehicle being tested is **CORRECTLY** wearing **APPROVED** safety/protective glasses before proceeding with any testing or adjustments.
4. **ALWAYS** insure that vehicle being tested is in Park or Neutral and Emergency Brake is engaged.
5. **ALWAYS** insure that the tester's black grounding clip is connected **FIRST** during hook-ups, and that it is disconnected **LAST** when testing is completed.
6. **ALWAYS** exercise **EXTREME** caution to insure that hands, arms, clothing, and tester leads are kept well away from **ALL** moving engine parts.

Due to the inherent dangers associated with even the simplest automotive maintenance procedures, the manufacturer and all parties involved in the distribution and/or sale of this automotive test product will **NOT** be held liable or responsible, wholly **OR** partially, for **ANY** injuries, damages or claims resulting from the performance of testing or adjustment procedures included in this instruction guide and/or the use of this automotive test product.

IMPORTANT NOTICE

THIS INSTRUMENT DESIGNED TO BE USED ON VEHICLES WITH 12 VOLT ELECTRICAL SYSTEMS AND RESISTIVE IGNITION WIRE ONLY. (Carbon core)

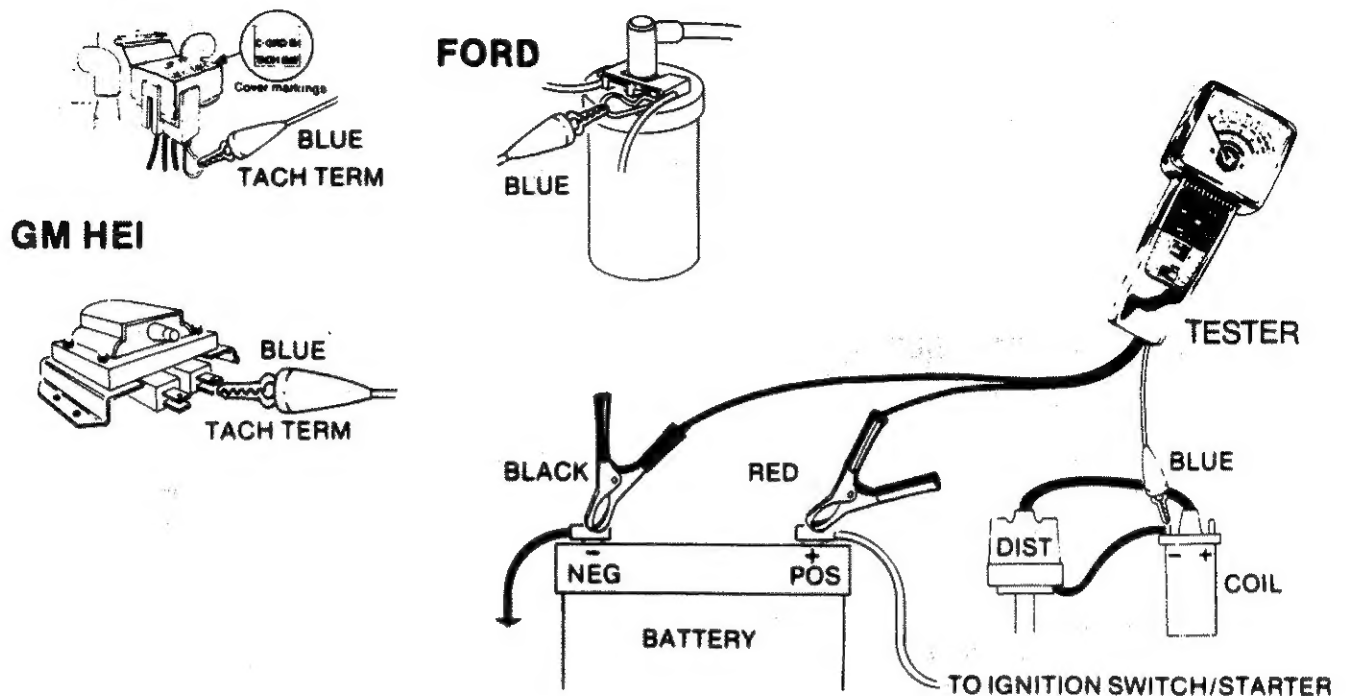
THE TESTING PROCEDURES AND INFORMATION IN THIS MANUAL IS INTENDED AS A GENERAL GUIDE FOR ENGINE TUNE UP AND ADJUSTMENTS ONLY. ALWAYS CONSULT THE VEHICLE MANUFACTURERS SERVICE MANUAL FOR SPECIFIC PROCEDURES. DO NOT ATTEMPT TO SERVICE YOUR VEHICLE WITHOUT FOLLOWING THE VEHICLE MANUFACTURERS INSTRUCTIONS AND SPECIFICATIONS.

MAKING TESTS:

Make proper hookups and select proper switch positions as indicated in each test. Proceed with testing. Maintaining your automobile in proper working order is the first requirement for performance, safety and economy. You can do it yourself by following the simple testing procedures outlined in these instructions. You must refer to the vehicle manufacturers manual or another reliable source for the proper tuneup specifications and repair procedures for the vehicle you are working on.

GENERAL HOOKUP FOR TESTING

TACHOMETER (RPM) AND DWELL



TEST A TACHOMETER (RPM)

Measuring engine speed (RPM) under various test conditions helps you adjust the carburetor idle speed, fast idle speed and idle mixture for maximum engine performance. Refer to your vehicles manufacturers service manual for the correct adjustment and/or carburetor replacement procedures for your vehicle.

MEASURING AND SETTING ENGINE IDLE SPEED

LO RPM

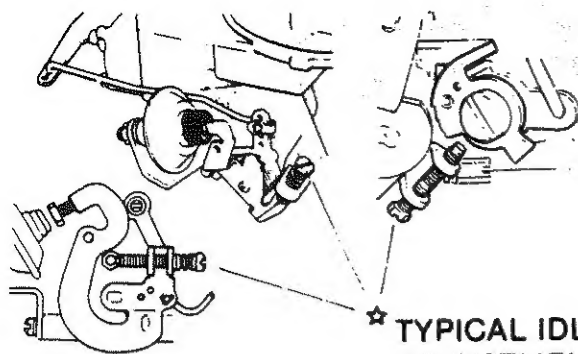
1. Start the engine and let it idle until the operating temperature of the engine is reached (about 2 minutes).
2. Read the engine RPM on the appropriate scale.
3. Adjust the idle speed per manufacturers specifications.

IDLE MIXTURE ADJUSTMENT

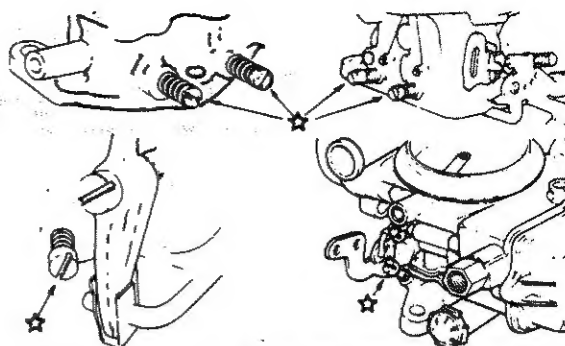
LO RPM

It is best to use the manufacturers idle mixture setting procedures whenever possible, but the following procedure will generally prove acceptable on those vehicles where emission control systems will allow it.

1. Start the engine, and warm up (about 2 minutes).
2. Turn idle mixture screw in (lean) until the engine RPM drops and engine idles rough.
3. Slowly turn the idle mixture screw out (rich) until maximum steady RPM is reached. (turn the screw only $\frac{1}{8}$ th of a turn at a time)



TYPICAL IDLE SPEED
ADJUSTMENT SCREWS



TYPICAL IDLE MIXTURE
ADJUSTMENT SCREWS

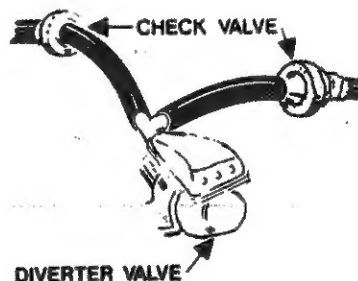
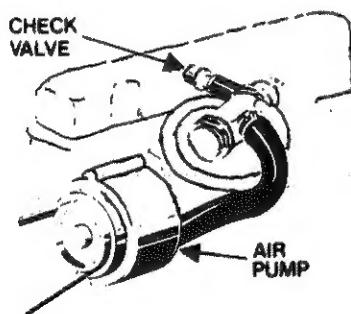
AIR INJECTION PUMP CHECK

HI RPM

If your vehicle is equipped with an air injection pump system, the efficiency of this system may be checked as follows:

1. Inspect the connecting hoses for possible cracks or breaks.
2. Disconnect the hose at the check valve location. Clear the check valve passage of any interfering dirt or debris.
3. Start the engine and maintain about 600 RPM, note the amount of air flow that is being released from the check valve.
4. Slowly increase engine speed to about 2,000 RPM, the air flow from the check valve should increase as the engine speed is increased. If it does not, a repair or replacement of the air injection pump is indicated.

AIR INJECTION PUMP



TEST B

DWELL

Dwell angle is the total number of degrees that the distributor shaft cam rotates while the contact points are closed. This is a critical factor in engine performance and is an integral part of engine timing. The contact points act as a switch to fire the spark plugs and even though electronic ignition systems do not contain mechanical contact points, the switching transistor in the module performs the same function and the other electronics in the module control the actual "dwell". To determine the dwell on your vehicle, perform the following:

CONVENTIONAL IGNITION SYSTEMS

1. Start the engine, read dwell on the appropriate scale and compare it to the vehicle manufacturers specifications.
2. Slowly increase and decrease engine speed . . . If the dwell reading changes 3-4 degrees or more, a worn distributor shaft, bearing or breaker plate is indicated.

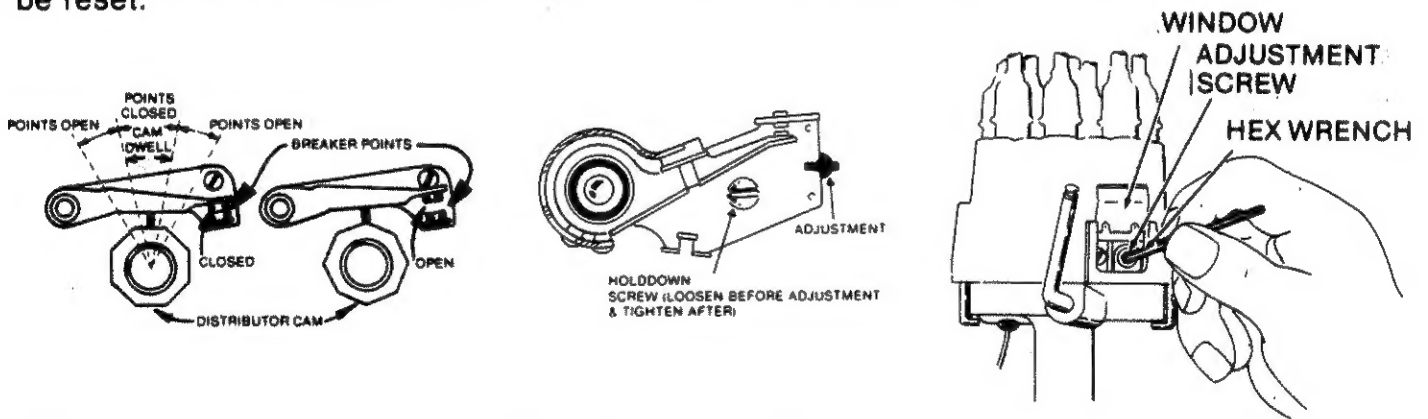
ELECTRONIC IGNITION SYSTEMS

1. Start the engine, read dwell on the appropriate scale and compare it to the vehicle manufacturers specifications.
2. Abruptly increase the engine speed to approximately 2,000 RPM, the dwell meter should show a change in the dwell reading if the electronic control module is working properly.
3. If the dwell did not change, replacement of the electronic module is indicated.

HOW TO ADJUST POINT DWELL

1. Remove the distributor cap, lift it out of the way and remove the rotor.
2. Bump the engine with the starter until the rubbing block on the point set is on the highest point of the distributor cam. This should be the position when the contact points are in their most open position. Measure the gap with a feeler gauge, and using the illustrations, adjust the gap to the manufacturers specifications. Some distributors have an external window which allow dwell adjustments with the engine running.
3. Put the rotor and the distributor cap back on the distributor. Restart the engine and check the dwell angle again. If it is still not to the vehicle manufacturers specifications, repeat the adjustment procedure until it is correct.

If new points are installed or dwell is adjusted, the engine timing will be changed and must be reset.

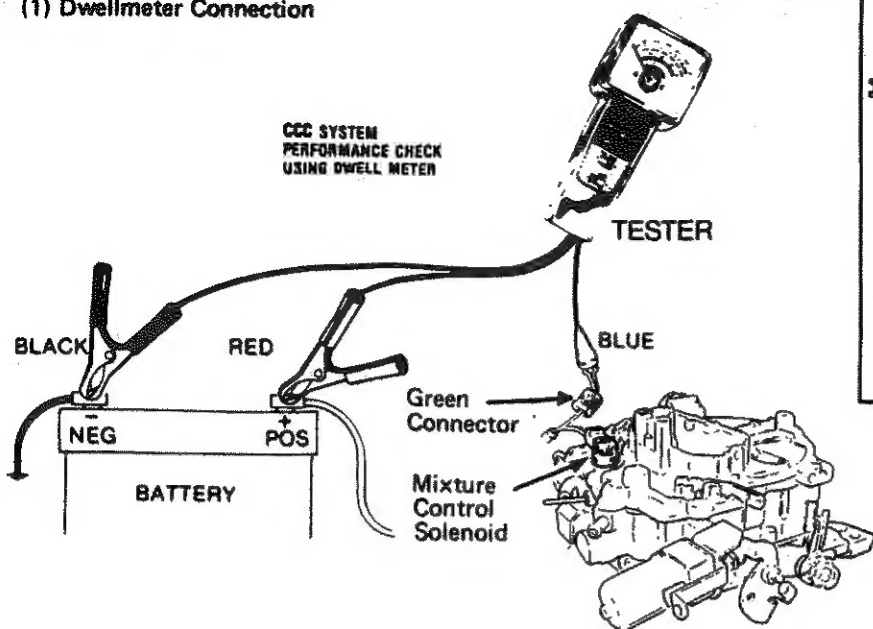


TEST C DUTY CYCLE TESTING

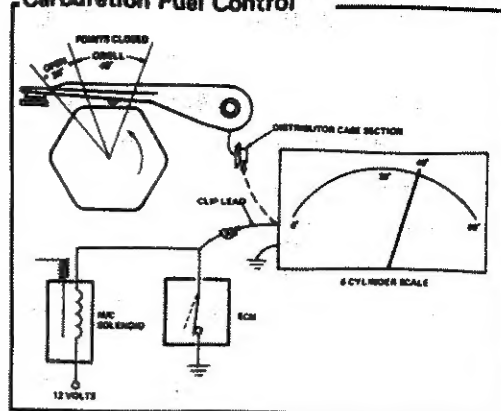
Testing the performance of the GM CCC system MC Solenoid is accomplished by connecting the red and black clips to the battery and the blue clip to the MC solenoid pigtail connector. You must switch the cylinder selector to the 6 cylinder position, regardless whether it is a 4, 6 or 8 cylinder engine, and observe the movement of the meter pointer. If the system is operating in "closed loop" the meter pointer will swing from between 5% and 55%, the engine must be warmed up to operating temperature prior to testing. The Duty cycle label on the back of the tester shows the relationship (DWEELL) of the meter swing (DUTY CYCLE) to the actual performance of the CCC controlling system. Refer to the manufacturers service manual for detailed testing, adjusting and repair procedures.

EXAMPLES:

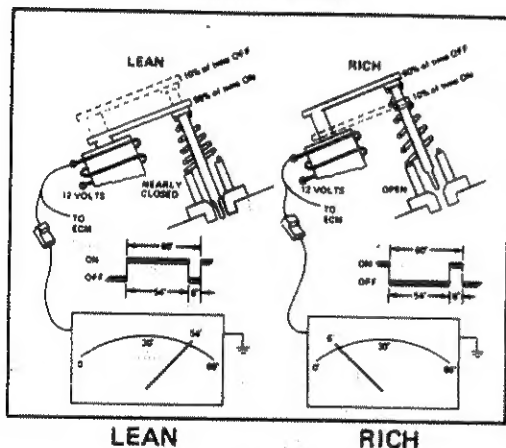
(1) Dwellmeter Connection



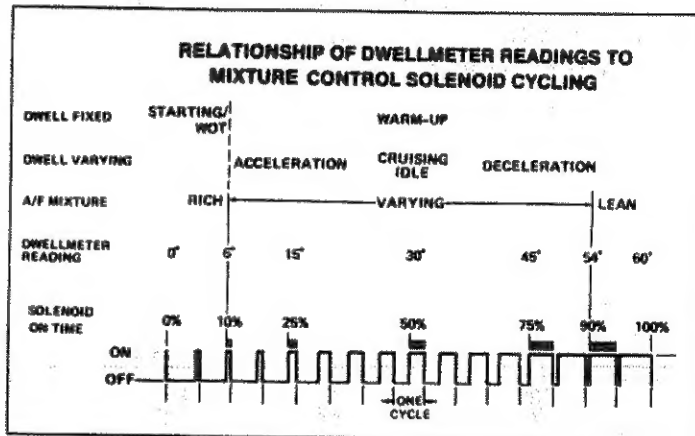
(2) Dwell Theory in relation to both the Dist. Points System (Mechanical) and the (Electrical) Carburetion Fuel Control



(3) Carburetor Mixture control Lean/Rich Dwell



(4) Dwellmeter Readings To Performance



TEST D POINT RESISTANCE

Without starting, bump engine until points close, read points condition on meter scale. Green zone is OK, Red zone indicates points need repair or replacement.

Should you ever need to have your tester serviced, please contact the following:

Instrument Service Company
P.O. Box 188
Otsego, Michigan 49078
(616) 694-9471

Please include the complete name and model number of your tester.